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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,903	06/27/2003	Stewart J. Lebrun	MGENE.011A	7778

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EXAMINER	
DUFFY, PATRICIA ANN	

ART UNIT	PAPER NUMBER
1645	

DATE MAILED: 05/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/608,903	LEBRUN, STEWART J.	
	Examiner	Art Unit	
	Patricia A. Duffy	1645	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 April 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 2 and 4-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

RESPONSE TO AMENDMENT

The amendment and response filed 4-27-06 has been entered into the record. Claim 3 has been cancelled. Claims 1, 2, and 4-10 are pending and under examination.

The text of Title 35 of the U.S. Code not reiterated herein can be found in the previous office action.

Rejections Withdrawn

The previous grounds of rejection are withdrawn based on Applicants' amendments to the claims.

New Rejections Based on Amendment

Claims 1, 2 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mroczkowski et al (US Patent No. 5,284,748, issued Feb 8, 1994; hereinafter Mroczkowski A) in view of Mroczkowski et al (US Patent No. 4,794,089, issued December 27, 1988; herein after Mroczkowski A), Harlow (Antibodies a Laboratory Manual, 1988, pages 563-566 and 579-582),, Herbrink et al (Journal of Immunological Methods, 48:293-298, 1982) and Pace et al. (US Patent No 4,233,144 issued November 11, 1990).

Mroczkowski A teaches a method for electrical detection of a binding reaction wherein the binding of two substances causes full or partial completion (closing) of an essentially open electrical circuit. The resulting change in the electrical state of the circuit indicates the binding reaction. The assay involves at least two electrical conductors (i.e. the instant electrodes) spaced apart on a substantially non-conductive base. The base has a support having a layer formed thereon, which has a high affinity for protein binding and moderate to high resistance in comparison to the conductors. The space between the conductors forms a path or channel (i.e. the instant streak). One of a pair of substances that bind each other is deposited or affixed to the binding layer of the non-conductive base between the conductors. Means forming an electrical circuit is

connected to each of the conductors so that the channel or path constitutes a break in the circuit. The circuit is completed by binding of a second or third member labeled with a conductor. The assay is heterogeneous in that it comprises suitable washing steps (see column 5; columns 13-14). The assay is adaptable for the detection of either antigen or antibody (see columns 5-6). The assay is described as useful for determining specific amounts of specific antibody in a sample wherein a sandwich is formed of the complex of antigen-first antibody-second antibody conductive particle. The secondary antibody could be anti-IgG or anti-IgE. The resistance measurements of the circuit are inversely related to the amount of the first antibody in the sample (see column 7). Mroczkowski A teach that as an alternative to a channel, diagnostic elements according to the invention, especially resistive shunting embodiments may utilize a resistive bioreactive path other than a channel. Mroczkowski A teach a multiple diagnostic array according to the invention (Figure 8, column 10 line 47 to column 11, line 23). The reference differs by not teaching nickel as the metal, a spot, washing after every step, measuring current and a "micro"array.

Mroczkowski B teaches a method for electrical detection of a binding reaction wherein essentially identical to Mroczkowski A, except that the presence of a member of a binding pair is measured by detection of the electrical current flow through the circuit formed by the electrically conductive particles upon binding to the first substance (see claim 1).

Harlow et al teach conventional indirect antibody capture assay and indirect antigen capture assay formats for the detection and quantitation of antibody and antigen respectively. Harlow et al teach the conventional wash steps after addition of the individual reagents in immunoassays (see pages 563-566 and pages 579-582). Harlow et al further teach

Herbrink et al teach that immunoassays can be performed by using or applying a "spot" on a substrate.

Pace et al (US Patent No 4,233,144 issued November 11, 1990). Pace et al teach immunoreactants labeled with electroactive substances (see abstract). Pace et al teach Fe, Co, Cu, Mo, Cd. V, Zn, Cr, Mn, and Ni as electroactive substances (see column 4, liens 55-65).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time that the invention was made to modify the method of Mroczkowski A by substituting the spot pattern of Herbrink et al for the channel, using the conventional techniques of the indirect antibody or antigen immunoassay methodology of Harlow et al, substitute electroactive nickel of Pace et al for the electroactive substances of Mroczkowski A and measure current as taught by Mroczkowski B because Mroczkowski A teaches that the assay is adaptable for the detection of either antigen or antibody (see columns 5-6), that as an alternatives to the channel may be used (i.e. bioreactive path other than a channel), that the binding reaction can be detected electrically and Pace et al teach that Nickel is an electroactive metal that can be used in electrical based immunoassays. It would have further been obvious to microtize-the diagnostic array assay as combined *supra* because in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device and microarray technology was conventional at the time that the invention was made.

Claims 4, 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mroczkowski et al (US Patent No. 5,284,748, issued Feb 8, 1994; hereinafter Mroczkowski A), Mroczkowski et al (US Patent No. 4,794,089, issued December 27, 1988; herein after Mroczkowski A), Harlow (Antibodies a Laboratory Manual, 1988, pages 563-566 and 579-

582) , Herbrink et al (Journal of Immunological Methods, 48:293-298, 1982) and Pace et al (US Patent No 4,233,144 issued November 11, 1990) as applied to claims 1, 2 and 10 above, and further in view of Bartlett (US Patent No. 5,679,709, issued October 21, 1997).

The combination of Mroczkowski et al (US Patent No. 5,284,748, issued Feb 8, 1994; hereinafter Mroczkowski A) in view of Mroczkowski et al (US Patent No. 4,794,089, issued December 27, 1988; herein after Mroczkowski A), Harlow (Antibodies a Laboratory Manual, 1988, pages 563-566 and 579-582), Herbrink et al (Journal of Immunological Methods, 48:293-298, 1982) and Pace et al (US Patent No 4,233,144 issued November 11, 1990) is set forth supra. The combination differs by not detecting the autoimmune state of systemic lupus erythematosus (SLE) and IgG antibodies.

Bartlett et al teach that a feature of SLE is the presence of antibodies against nuclear constituents. The anti-ds DNA antibodies of the IgG class are SLE-specific and are used for diagnosis. Bartlett et al teach that the IgG anti-ds DNA antibodies are measured by conventional art methods using an ELISA.

It would have been *prima facie* obvious to one having ordinary skill in the art at the time that the invention was made to modify the assay as combined *supra* by substituting ds-DNA as the antigen and detect anti-ds DNA antibodies in a sample for the diagnosis of the autoimmune disease SLE because Bartlett et al teach that anti- ds DNA antibodies of the IgG class are SLE-specific and Mroczkowski A teach that the assay is useful for determining specific amounts of specific antibody in a sample wherein a sandwich is formed of the complex of antigen-first antibody-second antibody conductive particle and the secondary antibody could be anti-IgG. It would also have been prima facie obvious to adapt the array assay as combined for "microarray" because in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device

and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device and microarray technology was conventional at the time that the invention was made.

Claims 6, 7, 8, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mroczkowski et al (US Patent No. 5,284,748, issued Feb 8, 1994; hereinafter Mroczkowski A), Mroczkowski et al (US Patent No. 4,794,089, issued December 27, 1988; herein after Mroczkowski A), Harlow (Antibodies a Laboratory Manual, 1988, pages 563-566 and 579-582) , Herbrink et al (Journal of Immunological Methods, 48:293-298, 1982) and Pace et al (US Patent No 4,233,144 issued November 11, 1990) as applied to claims 1, 2 and 10 above, and further in view of Aizawa et al (Analytic Chimica Acta, 365:109-113, 1998).

The combination of Mroczkowski et al (US Patent No. 5,284,748, issued Feb 8, 1994; hereinafter Mroczkowski A) in view of Mroczkowski et al (US Patent No. 4,794,089, issued December 27, 1988; herein after Mroczkowski A), Harlow (Antibodies a Laboratory Manual, 1988, pages 563-566 and 579-582), Herbrink et al (Journal of Immunological Methods, 48:293-298, 1982) and Pace et al (US Patent No 4,233,144 issued November 11, 1990) is set forth supra. The combination differs by not performing the assay on hydrophobic substrate such as poly(vinylidene difluoride) (PVDF).

Aizawa et al teach that PVDF is superior to nitrocellulose for binding of soluble proteins for dot immunoassays (page 113, column 1). Aizawa et al teach that the PVDF binding of soluble proteins is suitable for enzyme-based immunoassays (i.e. the instant colorimetric). Aizawa et al teach that PVDF membranes compared to nitrocellulose or diazobenzyloxymethyl membranes have the advantage for blotting proteins by its high protein binding capacity, mechanical strength and chemical stability (page 109, column 2).

It would have been prima facie obvious to one of ordinary skill in the art at the time that the invention was made to substitute PVDF membrane of Aizawa et al for the

nitrocellulose or DAB of Herbrink et al in the method as combined supra because Aizawa et al teach that PVDF membranes compared to nitrocellulose or diazobenzyloxymethyl membranes have the advantage for blotting proteins by its high protein binding capacity, mechanical strength and chemical stability. It further would have been *prima facie* obvious to run parallel colorimetric assays to independently verify the electrical immunoassay results to rule out false negatives an positives and Aizawa et al teach that PVDF is suitable for enzyme immunoassays.

Status of Claims

All claims stand rejected.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patricia A. Duffy whose telephone number is 571-272-0855. The examiner can generally be reached on M-Th 6:30 am - 6:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynette Smith can be reached on 571-272-0864.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Patricia A. Duffy
Primary Examiner
Art Unit 1645